

What is claimed is:

1. A method of producing a transgenic plant containing one or more free amino acids in edible parts in an amount larger than that contained in a untransformed plant of the same species cultured under the same conditions,
5 which comprises the step of transforming a plant with a genetic construct causing excessive expression of a glutamate dehydrogenase (GDH) gene, selecting or identifying the transformed plant based on a characteristics imparted by a marker gene connected to the genetic construct, screening the transformed plant in which one or more amino acids are accumulated in a larger
10 amount and selecting the transformed plant in which one or more free amino acids are accumulated in a larger amount.
2. The method according to claim 1, wherein the genetic construct contains a gene encoding GDH functionally connected to a powerful constitutive promoter
15 or fruit-specific promoter.
3. The method according to claim 2, wherein the constitutive promoter is CaMV35S promoter and the fruit-specific promoter is 2A11 promoter.
- 20 4. The method according to claim 1, wherein the genetic construct is selected from the group consisting of pAN-gdh-17, pCt-AN-gdh, pCt-dAN-gdh, pMt-dAN-gdh, p2ACt-dAN-gdh and p2AMt-dAN-gdh, each of said genetic construct containing NADP-GDH gene derived *Aspergillus nidulans*.
- 25 5. The method according to claim 1, wherein the genetic construct is pT-gdh-4 or pTd-gdh containing tomato NAD-GDH gene.
6. The method according to claim 1, wherein the free amino acid is selected from the group consisting of asparagine, aspartic acid, serine, threonine,
30 alanine, histidine and glutamic acid.

7. The method according to claim 6, wherein one of the free amino acids is free glutamic acid.
- 5 8. The method according to claim 1, wherein the transgenic plant is a transgenic tomato.
9. The method according to claim 1, wherein the transgenic plant is a transgenic potato.
- 10 10. A transgenic plants produced by the method according to claim 1 or a progeny plant thereof, which contains the genetic construct excessively express glutamate dehydrogenase.
- 15 11. A transgenic plant produced by the method according to claim 1, which has a glutamic acid content of an edible part thereof of at least twice as high as a corresponding untransformed plant, or a progeny plant thereof which has a glutamic acid content of the edible parts thereof of at least twice as high.
- 20 12. A transgenic plant produced by the method according to claim 1, wherein the total free amino acid content of an edible parts thereof is at least twice as high as a corresponding natural plant, or a progeny thereof wherein the total free amino acid content of an edible parts thereof is increased to at least twice as high.
- 25 13. A seed of the transgenic plant according to claim 10 or a seed of the progeny thereof, which contains a genetic construct which excessively expresses glutamate dehydrogenase.
- 30 14. A transgenic potato, wherein said potato contains a genetic construct

being able to express a GDH gene, and the total weight of tuber parts of the potato exhibits statistically significant increase compared to a untransformed potato cultured under the same conditions.

5 15. The transgenic potato according to claim 14, wherein said potato contains a genetic construct being able to express a GDH gene, and the total weight of tuber parts of the potato exhibits 1.5-fold or more increase compared to a untransformed potato cultured under the same conditions.

10 16. The transgenic potato according to claim 14, wherein the genetic construct contains a gene encoding GDH functionally connected to a powerful constitutive promoter.

15 17. The transgenic potato according to claim 16, wherein the constitutive promoter is CaMV35S promoter.

18. The transgenic potato according to claim 14, wherein the genetic construct contains *Aspergillus nidulans* NADP-GDH gene.

20 19. The transgenic potato according to claim 14, wherein GDH contains a transit peptide for mitochondria.

25 20. A method of producing a transgenic potato increased in the total weight of the tuber parts compared to a untransformed potato cultured under the same conditions, which comprises the step of transforming a plant with a genetic construct causing excessive expression of a glutamate dehydrogenase (GDH) gene, and selecting or identifying the transformed plant based on a character imparted by a marker gene connected to the genetic construct, screening the transformed plant in which the total weight of the tuber parts is increased and
30 selecting the transformed plant in which the total weight of the tuber parts is

increased.

21. The method according to claim 20, wherein the total weight of the tuber parts of the potato exhibits 1.5-fold or more increase compared to a
5 untransformed potato cultured under the same conditions.

22. The method according to claim 20, wherein the genetic construct contains a gene encoding GDH functionally connected to a powerful constitutive promoter.

10 23. The method according to claim 20, wherein the constitutive promoter is CaMV35S promoter.

24. The method according to claim 20, wherein the genetic construct contains *Aspergillus nidulans* NADP-GDH gene.

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25. The method according to claim 20, wherein GDH contains a transit peptide for mitochondria.